

WHAT IS CLAIMED IS:

1. A control apparatus for an internal combustion engine provided with a secondary air supply apparatus that supplies secondary air to a portion upstream of an exhaust gas control device in an exhaust system, characterized by comprising:

a detector that detects failure in the secondary air supply apparatus; and

a controller that limits an amount of air introduced into the internal combustion engine to a predetermined amount when failure in the secondary air supply apparatus is detected by the detector.

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2. The control apparatus for an internal combustion engine according to claim 1, characterized in that the controller reduces the amount of the air introduced into the internal combustion engine to the predetermined amount in a stepwise manner.

3. The control apparatus for an internal combustion engine according to claim 1 or 2, characterized in that the controller reduces the amount of the air introduced into the internal combustion engine to the predetermined amount at a predetermined change rate.

4. The control apparatus for an internal combustion engine according to any one of claims 1 to 3, wherein the internal combustion engine includes plural cylinders; and the secondary air supply apparatus includes i) a first opening/closing valve which opens/closes a first air passage through which air discharged from an air pump flows; ii) a second opening/closing valve which opens/closes a second air passage whose one end is connected to the first air passage at a portion downstream of the first opening/closing valve, and whose other end is connected to an exhaust passage leading to a predetermined cylinder among the plural cylinders; and iii) a third opening/closing valve which opens/closes a third air passage whose one end is connected to the first air passage at a portion downstream of the first opening/closing valve, and whose other end is connected to an exhaust passage leading to a cylinder different from the predetermined cylinder to

which the exhaust passage connected to the second air passage leads, characterized in that the detector detects presence or absence of failure in each of the first opening/closing valve, the second opening/closing valve, and the third opening/closing valve; and the controller limits the amount of the air introduced into the internal combustion engine according to presence or absence of failure in each of the first opening/closing valve, the second opening/closing valve, and the third opening/closing valve.

5. The control apparatus for an internal combustion engine according to claim 4, characterized in that when failure has occurred in at least one of the second opening/closing valve and the third opening/closing valve, and the first opening/closing valve, the controller limits the amount of the air introduced into the internal combustion engine so that the amount of the air introduced into the internal combustion engine is reduced, as compared to when failure has occurred in at least one of the second opening/closing valve and the third opening/closing valve, and failure has not occurred in the first opening/closing valve.

6. The control apparatus for an internal combustion engine according to claim 4, characterized in that when failure has occurred in the second opening/closing valve and the third opening/closing valve, the controller limits the amount of the air introduced into the internal combustion engine so that the amount of the air introduced into the internal combustion engine is reduced, as compared to when failure has occurred in one of the second opening/closing valve and the third opening/closing valve.

7. The control apparatus for an internal combustion engine according to any one of claims 1 to 6, characterized in that the controller controls an opening amount of a throttle valve provided in an intake pipe for the internal combustion engine so that the amount of the air introduced into the internal combustion engine is limited to the predetermined amount.

8. A control method for an internal combustion engine provided with a secondary air supply apparatus that supplies secondary air to a portion upstream of an exhaust gas control device in an exhaust system, characterized by comprising:

- 5           a step of detecting failure in the secondary air supply apparatus; and
- a step of limiting an amount of air introduced into the internal combustion engine to a predetermined amount when failure in the secondary air supply apparatus is detected in the step of detecting failure.